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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/648,801  
Filing Date: August 27, 2003  
Appellant(s): BOWDEN ET AL.

**MAILED**  
DEC 22 2006  
**GROUP 1700**

Fish & Richardson P.C.  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 11/09/06 appealing from the Office action mailed 08/24/06.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

2003/0134188

ROY et al

07-2003

EP 1326295

GUIDI et al

07-2003

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### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

#### ***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 25 is rejected under 35 U.S.C. 102(a) as being anticipated by the European publication 1326295 (hereinafter referred to as “*the EP’295*”).

#### As to claim 25:

The EP’295 discloses an electrochemical cell comprising a cathode having first and second active materials; an anode of an alkali metal (Abstract, CLAIM 1) such as lithium (P. 0037, 0033, CLAIM 4); and a separator separating the anode from the cathode (P.0039). Thus, it is a lithium battery. The cathode comprises a first active material including LiMnO<sub>2</sub> (*the reversible low capacity material*) (CLAIM 3). Therefore, the EP’295 discloses that it is known to use LiMnO<sub>2</sub> as the first active material. A second active material includes carbon fluoride CF<sub>x</sub> (*the irreversible high capacity material*) (P. 0020, 0023, CLAIM 3).

The EP’295 discloses that the first and second active materials are short-circuited to each other by contacting opposite sides of a current collector (P0002, 0010). Additionally, active materials 36, 38 and 40 (*representing both active materials*) touch at their peripheries beyond the

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current collector 32 and 34 (P. 0030,0036). The EP'295 discloses that the assemblies are compressed, and both first and second active material are maintained in a compressed state (P. 0030, 0036). The EP'295 discloses that it is known to roll, spread or press the first and second cathode active materials together (P.0024). Important to note is that an electrolyte having an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvent is also contacting the interface of the first and second active material peripheries because the electrolyte is a liquid medium; and dissociation of ion in atomic or molecular forms of the first and second active materials does occur (P.0040-0041).

*Examiner's Note: that is to say, they are in direct contact and together. Thus, since the first and second active material are maintained in a compressed state and they both touch at their respective ends or peripheries beyond the current collectors, it is contended that the first active material (i.e.  $\text{LiMnO}_2$ ) and the second active material (i.e. carbon fluoride  $\text{CF}_x$ ) are necessarily mixed at their respective interface, thereby they form a blended mixture at least at the interface where they touch each other. Due to the "touching" and compressed state characteristic they both are subject to at their ends or peripheries, the first and second active materials are in direct contact and forms an interface including a blended mixture of respective active materials. Such periphery touching of the active materials 36, 38 and 40 necessarily includes an interface which promotes mixing the two active materials. Again, it is imperative to note that an electrolyte having an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvent is also contacting the interface of the first and second active material peripheries because the electrolyte is a liquid medium; and dissociation of ion in atomic or molecular forms of the first and second active materials does occur.*

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Additionally, as to the implication of the limitation “*blended*” (defining a claim in terms a product-by-process limitation i.e. by blending the first and the second active materials), it is noted that a method limitation incorporated into a product claim does not patentably distinguish the product because what is given patentable consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

The EP’295 uses cathodes comprising a first active material including  $\text{LiMnO}_2$  (*the reversible low capacity material*) (CLAIM 3); and a second active material including  $\text{CF}_x$  (*the irreversible high capacity material*) (CLAIM 3). Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property or characteristic (i.e. the specific capacity), is necessarily present in the prior art material.

Thus, the EP’295 anticipates claim 25.

3. Claim 25 is rejected under 35 U.S.C. 102(e) as being anticipated by Roy et al 2003/0134188.

As to claim 25:

Roy et al discloses an electrochemical cell comprising a cathode having first and second active materials and an anode of an alkali metal (Abstract, CLAIM 1) such as lithium (P. 0014, CLAIM 8); and a separator separating the anode from the cathode (P.0028). Thus, it is a lithium battery. The cathode comprises a first active material including  $\text{LiMnO}_2$  (*the reversible low capacity material*) (CLAIM 4). Therefore, Roy et al discloses that it is known to use  $\text{LiMnO}_2$ . A second active material includes carbon fluoride  $\text{CF}_x$  (*the irreversible high capacity material*) (P. 0020, CLAIM 5).

Roy et al discloses that it is known to use together both first and second cathode active materials (P.0011-0012/FIGURES 1-2). Of particular interest is Roy et al's teaching that cathode component for incorporation into an electrochemical cell may be prepared by rolling, spreading or pressing the first and second active materials (P.0024). Also, disclosed is that the first and second active materials are short-circuited (P0003). *Thus, Roy et al contemplate using the first and second cathode materials together.*

(*Emphasis added*→) More significantly, Roy et al disclose that the electrochemical cell further includes a non-aqueous, ionically conductive electrolyte that serves as a medium for migration of ions between the anode and the cathode electrodes during the electrochemical reactions of the cell. The electrochemical at the electrodes involves conversion of ions in atomic or molecular forms that migrate from the anode to the cathode. Non-aqueous electrolytes suitable for this are substantially inert to the anode and cathode materials, they exhibit those physical properties necessary for ionic transport (P.0029). A suitable electrolyte has an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvents (P.0030). Roy et al disclose in paragraph 0025 and illustrate in FIGURE 2 that current collectors 32, 34 are perforated structures having on respective sides first and second active materials (P0025/FIGURE 2).

Examiner's Note: *in the context of having a medium for migration of ions, when ions in atomic or molecular forms dissociate from the first and second cathode active materials, they migrate from the cathode material to the anode material by using the ion migration medium which comprises a mixture of aprotic solvents and an ionically conductive salt dissolved therein. Therefore, the ions dissociated from the first active material (i.e.  $\text{LiMnO}_2$ ) and the second active*

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*material (i.e. carbon fluoride  $CF_x$ ) directly combine with the conductive salt dissolved in a mixture of solvents to form a blended mixture containing both the first and second active materials, as well as the salt and the solvent. Note that during charging/discharging cycles respective active materials contact one another by contacting common electrolytic medium through the perforated structure of the current collector. Thus, it can be contended that the cathode, as a whole or unitary structure, does encompass a mixture thereof. Stated alternatively, Roy et al show first and second active materials that are electrochemically mixed in atomic or molecular forms for power generation purposes.*

Additionally, as to the implication of the limitation “*blended*” (defining a claim in terms a product-by-process limitation i.e. by blending the first and the second active materials), it is noted that a method limitation incorporated into a product claim does not patentably distinguish the product because what is given patentable consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made.

Roy et al use cathodes comprising a first active material including  $LiMnO_2$  (*the reversible low capacity material*) (CLAIM 4); and a second active material including  $CF_x$  (*the irreversible high capacity material*) (CLAIM 5). Accordingly, products of identical chemical composition can not have mutually exclusive properties, and thus, the claimed property or characteristic (i.e. the specific capacity), is necessarily present in the prior art material.

Thus, Roy et al anticipate claim 25.



**(10) Response to Argument**

All of the arguments advanced by the Appellant in the brief on appeal dated 11/09/06 have been thoroughly considered but they are still unpersuasive. After the drastic cancellation of all other previously rejected claims 19-24 and 26-40, and withdrawn claims 41-45 (See amendment dated 11/09/06 which accompanied the foregoing brief on appeal), applicant is focusing the issues under appeal on the rejection of claim 25 which remains the sole rejected claim, an now the only independent claim, in the present application.

The main contention of appellant's arguments to rebut the rejections under Section 102 above is premised on the assertion that the prior art of record does not disclose that "*the manganese dioxide and the carbon fluoride are blended*". Applicant has made the allegation that the contention relying upon by the examiner to show the mixture and blending of the manganese dioxide and the carbon fluoride "*is mere Examiner's argument, and falls far short of meeting the legal requirement of a 35 USC 102 rejection*". Certainly, the examiner respectfully but strenuously disagrees with this Appellant's argument.

Before discussing technical aspects of the two prior art references, the examiner likes to emphasize that it appears that appellant is giving the terms "mixture" and "blended" a very narrow definition or meaning which in no way is fully supported by the as-filed specification. What is very important to note here is that appellant's specification only discloses "blended" in a broad sense in single-one paragraph at page 2, lines 6-7. Applicant does not discuss or describe what is meant by having the lithiated manganese dioxide and the carbon fluoride blended in a broadly detailed manner, much less in a specifically descriptive sense. For convenience, reproduction of the only available disclosure or description thereof is presented: "*The lithiated*

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*manganese dioxide and the carbon fluoride can be blended*" (See appellant's specification at page 2, lines 6-7). Other than that, there is no additional indication or guidance to know what was ultimately intended by the applicant when he/she filed the present application.

With that in mind, the examiner now states that the term "mixture", "mix" and "blend" may have different semantic meanings which do not necessarily circumscribe the same definition or scope for the same term. Using Merriam-Webster's Collegiate Dictionary (10<sup>th</sup> Edition) as a reference, the term "mixture" may be defined as "the act, the process, or an instance of mixing", or "the state of being mixed", or "the relative proportions of constituents", or "a product of mixing combination", or "a portion of matter consisting of two or more components in varying proportions that retain their own properties", or "a combination of several different kinds". Similarly, the term "mix" may be defined as "to combine or blend into", or "to combine with another", or "to bring into close association". Likewise, the term "blend" may be defined as "to combine or associate separate constituents", or "to prepare by intermingling different varieties", or "to combine into an integrated whole". The examiner has presented this to demonstrate how ample the definition of each of the above terms can be (i.e. the amplitude of the definition that might be attributed to each of the foregoing terms) for purposes of both claim interpretation and prior art construction when precise description or definition of any given term is omitted in the as-filed specification.

On the other hand, if the examiner were to rely upon definitions provided by the "state of the art" in the context of the present application, there would be no doubt that the term "blend" must adhere to the what is taught or disclosed in the cited references (i.e. the EP'295 and Roy et al'188) as these two references probably are the closest references to applicant's field of

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endeavor, technology or inventive concept. As such, there should be no question or doubt that then both the EP'295 and Roy et al'188 are fully anticipatory of applicant's invention.

In short, appellant's specification fails to provide specific direction for ascertaining the definition, scope and implication of the terms "mixture" and "blend". Then, if we take the way the cited references mix, combine or blend the first and second cathode active materials to form a cathode structure as a guidance for ascertaining their meanings, then by following "state-of-art" direction, both EP'295 and Roy et al'188 fully and clearly anticipate appellant's invention. On the other hand, if we use the definitions of Merriam-Webster's Collegiate Dictionary (10<sup>th</sup> Edition) as a way to understand appellant's invention, then we find plural alternatives to define and conceptualize appellant's invention. Each alternative potentially encompassing different scopes for each term. Therefore, without attempting to diminish the issues on appeal, the examiner notes that the final decision might depend on how the claim language itself is interpreted and the prior art is constructed.

One more aspect the examine likes to add is that there is no clear direction or indication in the present claims, nor is in appellant's specification to determine if appellant's first and second cathode active materials are intimately mixed prior to blending, or intimately mixed prior to being assembled in the battery, or intimately mixed prior to be placed on a substrate, or if they are blended prior to incorporation into the electrochemical cell or blended prior to formation of the final cathode structure, or whether they are rolled, compressed or pressed at any point before, during or after blending takes place. Furthermore, the present claims are wholly silent about whether the first and second cathode active materials are prepared together (i.e. pouring together the two materials into a mixing container and stirring them to form a uniform mixture) or prepare

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separately (i.e. preparing each of the first and second active materials independently and then layering or coating one upon another to form a blended layered cathode structure), or how the second active materials is incorporated or blended into the first active material.

(Emphasis added→) It is also immediately unclear whether applicant's blended mixture is a chemical mixture or physical mixture; yet further, whether applicant's blended mixture refers to a solid blended mixture, aqueous blended mixture or gelled blended mixture between the first and the second active materials. These are critical aspects left undefined or unaddressed by the appellant because the as-filed specification is silent on how blending is carried out.

In consequence, in the broadest reasonable interpretation of appellant's invention, the examiner believes that the prior art of record read thereon.

Moving now into the discussion of technical aspects, the examiner respectfully notes the following teachings disclosed by the cited prior art references:

The EP'295 discloses that the first and second active materials are short-circuited to each other by contacting opposite sides of a current collector (P0002, 0010). Additionally, active materials 36, 38 and 40 (*representing both active materials*) touch at their peripheries beyond the current collector 32 and 34 (P. 0030,0036). The EP'295 discloses that the assemblies are compressed, and both first and second active material are maintained in a compressed state (P. 0030, 0036). The EP'295 discloses that it is known to roll, spread or press the first and second cathode active materials together (P.0024). Important to note is that an electrolyte having an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvent is also contacting the interface of the first and second active material peripheries because the electrolyte

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is a liquid medium; and dissociation of ion in atomic or molecular forms of the first and second active materials does occur (P.0040-0041).

The examiner's position: the EP'295 directly teaches that the first and second active materials are in direct contact and together because the first and second active material are maintained in a compressed state and they both touch at their respective ends or peripheries beyond the current collectors. Therefore, it is contended that the first active material (i.e.  $\text{LiMnO}_2$ ) and the second active material (i.e. carbon fluoride  $\text{CF}_x$ ) are necessarily mixed at their respective interface, thereby they form a blended mixture at least at the interface where they touch each other. Due to the "touching" and compressed state characteristic they both are subject to at their ends or peripheries, the first and second active materials are in direct contact and forms an interface including a blended mixture of respective active materials. Such periphery touching of the active materials 36, 38 and 40 necessarily includes an interface which promotes mixing the two active materials. Again, it is imperative to note that an electrolyte having an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvent is also contacting the interface of the first and second active material peripheries because the electrolyte is a liquid medium; and dissociation of ion in atomic or molecular forms of the first and second active materials does occur.

Roy et al discloses that it is known to use together both first and second cathode active materials (P.0011-0012/FIGURES 1-2). Of particular interest is Roy et al's teaching that cathode component for incorporation into an electrochemical cell may be prepared by rolling, spreading or pressing the first and second active materials (P.0024). Also, disclosed is that the first and

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second active materials are short-circuited (P0003). Thus, Roy et al contemplate using the first and second cathode materials together.

(Emphasis added→) More significantly, Roy et al disclose that the electrochemical cell further includes a non-aqueous, ionically conductive electrolyte that serves as a medium for migration of ions between the anode and the cathode electrodes during the electrochemical reactions of the cell. The electrochemical at the electrodes involves conversion of ions in atomic or molecular forms that migrate from the anode to the cathode. Non-aqueous electrolytes suitable for this are substantially inert to the anode and cathode materials, they exhibit those physical properties necessary for ionic transport (P.0029). A suitable electrolyte has an inorganic, ionically conductive salt dissolved in a mixture of aprotic organic solvents (P.0030). Roy et al disclose in paragraph 0025 and illustrate in FIGURE 2 that current collectors 32, 34 are perforated structures having on respective sides first and second active materials (P0025/FIGURE 2).

The Examiner's position: in the context of having a medium for migration of ions as disclosed by Roy et al, when ions in atomic or molecular forms dissociate from the first and second cathode active materials, they migrate from the cathode material to the anode material by using the ion migration medium which comprises a mixture of aprotic solvents and an ionically conductive salt dissolved therein. Therefore, the ions dissociated from the first active material (i.e.  $\text{LiMnO}_2$ ) and the second active material (i.e. carbon fluoride  $\text{CF}_x$ ) directly combine with the conductive salt dissolved in a mixture of solvents to form a blended mixture containing both the first and second active materials, as well as the salt and the solvent. Note that during charging/discharging cycles respective active materials contact one another by contacting

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common electrolytic medium through the perforated structure of the current collector. Thus, it can be contended that the cathode, as a whole or unitary structure, does encompass a mixture thereof. Stated alternatively, Roy et al show first and second active materials that are electrochemically mixed and blended in atomic or molecular forms for power generation purposes.

The general idea of applicant's contention is focused primarily on the allegation that the prior art of record discloses that "*the two cathode materials are not mixed*". The examiner fully disagrees with applicant's contention and presents the following in support of the sustained rejections:

- the EP'295 discloses that the first and second active materials are short-circuited to each other by contacting opposite sides of a current collector (P0002, 0010); additionally, active materials 36, 38 and 40 (*representing both active materials*) touch at their peripheries beyond the current collector 32 and 34 (P0030,0036). Again, such periphery touching of the active materials 36, 38 and 40 necessarily includes an interface which promotes mixing the two active materials at least at the interface.

- Roy et al disclose in paragraph 0025 and illustrate in FIGURE 2 that current collectors 32, 34 are perforated structures having on respective sides first and second active materials (P0025/FIGURE 2). Also, disclosed is that the first and second active materials are short-circuited (P0003). Note that during charging/discharging cycles respective active materials contact one another by contacting common electrolytic medium through the perforated structure of the current collector. Thus, it can be contended that the cathode, as a whole or unitary structure, does encompass a mixture thereof for electrochemical purposes. Stated alternatively,

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Roy et al show first and second active materials that are electrochemically mixed for power generation purposes. In addition to that, Roy et al discloses that it is known to use together both first and second cathode active materials (P.0011-0012/FIGURES 1-2). Of particular interest is Roy et al's teaching that cathode component for incorporation into an electrochemical cell may be prepared by rolling, spreading or pressing the first and second active materials (P.0024). Also, disclosed is that the first and second active materials are short-circuited (P0003). Thus, Roy et al contemplate using the first and second cathode materials together.

Additionally, as to the implication of the limitation "*blended*" (defining a claim in terms a product-by-process limitation i.e. by blending the first and the second active materials), it is noted that a method limitation incorporated into a product claim does not patentably distinguish the product because what is given patentable consideration is the product itself and not the manner in which the product was made. Therefore, the patentability of a product is independent of how it was made. According to MPEP 2113 Product-by-Process Claims, product-by-process limitations are given patentable weight when appellant provides objective evidence to demonstrate that such a limitation imparts an unobvious difference such as superior characteristics (unexpected results) and/or a product having a different structure. The burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. *In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983). As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith. *In re Brown*, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972). "The Patent Office bears a lesser burden of proof in making out a case of prima facie for



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product-by-process claims because of their peculiar nature” than when a product is claimed in the conventional fashion. *In re Fessmann*, 489 F.2d 742, 744, 180 USPQ 324, 326 (CCPA 1974).

Ipsso facto, the burden shifts to the appellant to show such an unobvious difference.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner’s answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Raymond Alejandro



Conferees:

Pat Ryan

William Krynski

